WHAT IS CLAIMED IS:

1. An endoscopic lithotripsy apparatus comprising:

an elongated probe which includes a distal end and a proximal end, the distal end being to be inserted into a body cavity;

an ultrasonic vibration source detachably attached to the proximal end of the probe to transmit an ultrasonic vibration to the probe in a state in which the proximal end of the probe is connected to the ultrasonic vibration source;

a mechanical shock generation source which is disposed on a side of the proximal end of the probe and which applies a force to the ultrasonic vibration source, in a state in which the ultrasonic vibration source is detached from the proximal end of the probe and which allows the ultrasonic vibration source to collide with the proximal end of the probe to apply a mechanical shock to the probe; and

a switch mechanism to switch a state in which the ultrasonic vibration from the ultrasonic vibration source is transmitted to the proximal end of the probe and a state in which the mechanical shock from the mechanical shock generation source is transmitted.

2. The endoscopic lithotripsy apparatus according to claim 1, wherein the mechanical shock generation source includes a coil which is disposed on an outer

periphery of the ultrasonic vibration source and which generates a magnetic force to move the ultrasonic vibration source toward the proximal end of the probe, when a pulse current is supplied to the coil.

3. The endoscopic lithotripsy apparatus according to claim 2, wherein the ultrasonic vibration source includes a Langevin type ultrasonic vibrator to ultrasonically vibrate when a power is supplied to the ultrasonic vibrator, and a horn which is connected to the ultrasonic vibrator to enlarge an amplitude of the ultrasonic vibration generated by the ultrasonic vibrator.

4. The endoscopic lithotripsy apparatus according to claim 3, wherein the probe and the ultrasonic vibrator are formed on the same axis and have cylindrical shapes in which communication holes communicating with each other are formed, and

the ultrasonic vibration source includes a suction device connected to the proximal end of the ultrasonic vibration source so as to be capable of automatically sucking a crushed treatment object through the communication hole in a state in which the ultrasonic vibration is transmitted to the proximal end of the probe from the ultrasonic vibration source.

5. The endoscopic lithotripsy apparatus according to claim 4, wherein the suction device includes a suction switch connected to the suction device so as to

forcibly operate the suction device.

6. The endoscopic lithotripsy apparatus according to claim 4, wherein the switch mechanism includes:

a cylindrical case in which the mechanical shock generation source is disposed in a cylindrical shape and in which the ultrasonic vibration source is disposed inside the mechanical shock generation source and which movably supports the ultrasonic vibration source with respect to the mechanical shock generation source and which includes a screw portion on the outer peripheral surface of the distal end;

a coupling member which is supported by the inner peripheral surface of the distal end of the case and which is connected to the proximal end of the probe; and

a cover member which includes a screw portion screwed onto the screw portion of the distal end of the case and which abuts on the coupling member and which is rotated by the distal end of the case so as to attach/detach the coupling member with respect to the ultrasonic vibration source.

7. The endoscopic lithotripsy apparatus according to claim 1, wherein the switch mechanism includes:

a cylindrical case in which the mechanical shock generation source is disposed in a cylindrical shape and in which the ultrasonic vibration source is disposed inside the mechanical shock generation source

and which movably supports the ultrasonic vibration source with respect to the mechanical shock generation source and which includes a screw portion on the outer peripheral surface of the distal end;

a coupling member which is supported by the inner peripheral surface of the distal end of the case and which is connected to the proximal end of the probe; and

a cover member which includes a screw portion screwed onto the screw portion of the distal end of the case and which abuts on the coupling member and which is rotated by the distal end of the case so as to attach/detach the coupling member with respect to the ultrasonic vibration source.

8. The endoscopic lithotripsy apparatus according to claim 7, wherein the mechanical shock generation source includes a coil which is disposed on an outer periphery of the ultrasonic vibration source to generate a magnetic force to move the ultrasonic vibration source toward the proximal end of the probe, when a pulse current is supplied to the coil.

9. The endoscopic lithotripsy apparatus according to claim 7, wherein the ultrasonic vibration source includes a Langevin type ultrasonic vibrator to ultrasonically vibrate when a power is supplied to the ultrasonic vibrator, and a horn which is connected to the ultrasonic vibrator to enlarge an amplitude of the

ultrasonic vibration generated by the ultrasonic vibrator.

10. The endoscopic lithotripsy apparatus according to claim 7, wherein the probe and the ultrasonic vibrator are formed on the same axis and have cylindrical shapes in which communication holes communicating with each other are formed, and

the ultrasonic vibration source includes a suction device connected to the proximal end of the ultrasonic vibration source so as to be capable of automatically sucking a crushed treatment object through the communication hole in a state in which the ultrasonic vibration is transmitted to the proximal end of the probe from the ultrasonic vibration source.

11. The endoscopic lithotripsy apparatus according to claim 1, wherein the probe and the ultrasonic vibrator are formed on the same axis and have cylindrical shapes in which communication holes communicating with each other are formed, and

the ultrasonic vibration source includes a suction device connected to the proximal end of the ultrasonic vibration source so as to be capable of automatically sucking a crushed treatment object through the communication hole in a state in which the ultrasonic vibration is transmitted to the proximal end of the probe from the ultrasonic vibration source.

12. The endoscopic lithotripsy apparatus according

to claim 1, wherein the ultrasonic vibration source includes a Langevin type ultrasonic vibrator to ultrasonically vibrate when a power is supplied to the ultrasonic vibrator, and a horn which is connected to the ultrasonic vibrator to enlarge an amplitude of the ultrasonic vibration generated by the ultrasonic vibrator.

13. An endoscopic lithotripsy apparatus comprising:

an elongated probe which includes a distal end and a proximal end, the distal end being to be inserted into a body cavity;

an ultrasonic vibration source detachably attached to the proximal end of the probe to transmit an ultrasonic vibration to the probe in a connected state to the proximal end of the probe;

a mechanical shock generation source which is disposed on a side of the proximal end of the probe and which applies a force in a direction to detach the proximal end of the probe with respect to the ultrasonic vibration source to apply a mechanical shock to a treatment object from the distal end of the probe; and

a switch mechanism to switch a state in which the ultrasonic vibration from the ultrasonic vibration source is transmitted to the proximal end of the probe and a state in which the mechanical shock from the

mechanical shock generation source is transmitted.

14. The endoscopic lithotripsy apparatus according to claim 13, wherein the mechanical shock generation source includes a coil which generates a magnetic force to move the probe in the axial direction, when a pulse current is supplied to the coil.

15. The endoscopic lithotripsy apparatus according to claim 14, wherein the ultrasonic vibration source includes a Langevin type ultrasonic vibrator to ultrasonically vibrate when a power is supplied to the ultrasonic vibrator, and a horn which is connected to the ultrasonic vibrator to enlarge an amplitude of the ultrasonic vibration generated by the ultrasonic vibrator.

16. The endoscopic lithotripsy apparatus according to claim 15, wherein the probe and the ultrasonic vibration source are formed on the same axis and have cylindrical shapes in which communication holes communicating with each other are formed, and

the ultrasonic vibration source includes a suction device connected to the proximal end of the ultrasonic vibration source so as to be capable of automatically sucking a crushed treatment object through the communication hole in a state in which the ultrasonic vibration is transmitted to the proximal end of the probe from the ultrasonic vibration source.

17. The endoscopic lithotripsy apparatus according

to claim 16, wherein the suction device includes a suction switch connected to the suction device so as to forcibly operate the suction device.

18. The endoscopic lithotripsy apparatus according to claim 16, wherein the switch mechanism includes an engaging portion which detachably attaches the proximal end of the probe to the ultrasonic vibration source.

19. The endoscopic lithotripsy apparatus according to claim 18, wherein the engaging portion includes a screw portion.

20. The endoscopic lithotripsy apparatus according to claim 19, wherein the probe includes a handle which adjusts a closely attached state between the proximal end of the probe and the ultrasonic vibration source.

21. The endoscopic lithotripsy apparatus according to claim 20, wherein the mechanical shock generation source includes a coil which generates a magnetic force to move the probe in the axial direction, when a pulse current is supplied to the coil.

22. The endoscopic lithotripsy apparatus according to claim 20, wherein the ultrasonic vibration source includes a Langevin type ultrasonic vibrator to ultrasonically vibrate when a power is supplied to the ultrasonic vibrator, and a horn which is connected to the ultrasonic vibrator to enlarge an amplitude of the ultrasonic vibration generated by the ultrasonic vibrator.

23. The endoscopic lithotripsy apparatus according to claim 20, wherein the probe and the ultrasonic vibration source are formed on the same axis and have cylindrical shapes in which communication holes communicating with each other are formed, and

the ultrasonic vibration source includes a suction device connected to the proximal end of the ultrasonic vibration source so as to be capable of automatically sucking a crushed treatment object through the communication hole in a state in which the ultrasonic vibration is transmitted to the proximal end of the probe from the ultrasonic vibration source.

24. The endoscopic lithotripsy apparatus according to claim 17, wherein the switch mechanism includes the mechanical shock generation source in a cylindrical shape, the ultrasonic vibration source is disposed inside the mechanical shock generation source, and the switch mechanism includes an engaging portion to switch a state in which the ultrasonic vibration source is fixed to the mechanical shock generation source and a state in which the ultrasonic vibration source is movable with respect to the mechanical shock generation source.

25. The endoscopic lithotripsy apparatus according to claim 24, wherein the engaging portion is disposed on the inner peripheral surface of the mechanical shock generation source and on the outer peripheral surface

of the ultrasonic vibration source.

26. The endoscopic lithotripsy apparatus according to claim 24, wherein the mechanical shock generation source includes a coil to generate a magnetic force to move the probe along the axial direction, when a pulse current is supplied to the coil.

27. The endoscopic lithotripsy apparatus according to claim 24, wherein the ultrasonic vibration source includes a Langevin type ultrasonic vibrator to ultrasonically vibrate when a power is supplied to the ultrasonic vibrator, and a horn which is connected to the ultrasonic vibrator to enlarge an amplitude of the ultrasonic vibration generated by the ultrasonic vibrator.

28. The endoscopic lithotripsy apparatus according to claim 24, wherein the probe and the ultrasonic vibration source are formed on the same axis and have cylindrical shapes in which communication holes communicating with each other are formed, and

the ultrasonic vibration source includes a suction device connected to the proximal end of the ultrasonic vibration source so as to be capable of automatically sucking a crushed treatment object through the communication hole in a state in which the ultrasonic vibration is transmitted to the proximal end of the probe from the ultrasonic vibration source.

29. The endoscopic lithotripsy apparatus according

to claim 17, wherein the mechanical shock generation source includes a coil which is disposed on an outer periphery of the ultrasonic vibration source to generate a magnetic force to move the probe along the axial direction, when a pulse current is supplied to the coil, and

the switch mechanism includes a permanent magnet attached/detached with respect to the proximal end of the probe by the direction of the magnetic force generated based on the direction of the current passed through the coil.

30. The endoscopic lithotripsy apparatus according to claim 29, wherein the ultrasonic vibration source includes a Langevin type ultrasonic vibrator to ultrasonically vibrate when a power is supplied to the ultrasonic vibrator, and a horn which is connected to the ultrasonic vibrator to enlarge an amplitude of the ultrasonic vibration generated by the ultrasonic vibrator.

31. The endoscopic lithotripsy apparatus according to claim 29, wherein the probe and the ultrasonic vibration source are formed on the same axis and have cylindrical shapes in which communication holes communicating with each other are formed, and

the ultrasonic vibration source includes a suction device connected to the proximal end of the ultrasonic vibration source so as to be capable of automatically

sucking a crushed treatment object through the communication hole in a state in which the ultrasonic vibration is transmitted to the proximal end of the probe from the ultrasonic vibration source.

32. The endoscopic lithotripsy apparatus according to claim 13, wherein the probe and the ultrasonic vibration source are formed on the same axis and have cylindrical shapes in which communication holes communicating with each other are formed, and

the ultrasonic vibration source includes a suction device connected to the proximal end of the ultrasonic vibration source so as to be capable of automatically sucking a crushed treatment object through the communication hole in a state in which the ultrasonic vibration is transmitted to the proximal end of the probe from the ultrasonic vibration source.

33. The endoscopic lithotripsy apparatus according to claim 13, wherein the ultrasonic vibration source includes a Langevin type ultrasonic vibrator to ultrasonically vibrate when a power is supplied to the ultrasonic vibrator, and a horn which is connected to the ultrasonic vibrator to enlarge an amplitude of the ultrasonic vibration generated by the ultrasonic vibrator.

34. A lithotripsy method of a treatment object using an endoscopic lithotripsy apparatus, comprising:

inserting an elongated probe of the endoscopic

lithotripsy apparatus including the probe into a body cavity through an endoscope;

supplying a power to a mechanical shock generation source and applying a mechanical shock to a proximal end of the probe inserted in the body cavity to crush the treatment object by a distal end of the probe;

connecting an ultrasonic vibration source to the proximal end of the probe to supply the power to the ultrasonic vibration source; and

transmitting an ultrasonic vibration to the proximal end of the probe to further finely crush the treatment object by the distal end of the probe.

35. The lithotripsy method of the treatment object using the endoscopic lithotripsy apparatus according to claim 34, further comprising:

connecting the ultrasonic vibration source to the proximal end of the probe to supply the power to the ultrasonic vibration source and transmitting the ultrasonic vibration to the proximal end of the probe to finely crush the treatment object by the distal end of the probe and to suck the crushed treatment object.

36. A lithotripsy method of a treatment object using an endoscopic lithotripsy apparatus, comprising:

inserting an elongated probe of the endoscopic lithotripsy apparatus including the probe into a body cavity through an endoscope;

supplying a power to a mechanical shock generation

source and moving the probe inserted in the body cavity in an axial direction of the probe to crush the treatment object by a distal end of the probe;

closely attaching an ultrasonic vibration source to the proximal end of the probe to supply the power to the ultrasonic vibration source; and

transmitting an ultrasonic vibration to the proximal end of the probe to further finely crush the treatment object by the distal end of the probe.